CLAIMS

What is claimed is:

1. A radio-frequency identification (RFID) tag including:

a non-volatile memory;

a tag controller to receive an update value, and to store a first calibration value within the non-volatile memory responsive to the receipt of the update value; and

an oscillator, coupled to the non-volatile memory, to receive the stored first calibration value from the non-volatile memory and to be calibrated in accordance with the first calibration value.

2. The tag of claim 1, wherein the update value is received in association with a calibration command, and the first calibration value is stored within the non-volatile memory responsive to the calibration command.

3. The tag of claim 1, wherein the tag controller is to generate the first calibration value within the RFID tag, and wherein the update value is a first modification value by which a second calibration value, generated within the RFID tag, is modified by the tag controller to generate the first calibration value.

4. The tag of claim 3, wherein the tag controller is to at least one of increment and decrement the second calibration value utilizing the modification value to thereby generate the first calibration value.

5. The tag of claim 1, wherein the update value is equal to the first calibration value, the update value having been generated in a calibration device external to the RFID tag, and the tag controller is to store the update value within the non-volatile memory as the first calibration value.

6. The tag of 5, including a front-end to receive the calibration command and the associated update value from the calibration device via at least one of a wire link and a radio-frequency link.

7. The tag of claim 6, wherein the calibration device is at least one of an RFID reader or a tester device to a test the RFID tag.

8. The tag of claim 1, wherein the calibration value is independent of a frequency of a forward link radio-frequency signal received at the RFID tag.

9. The tag of claim 1, wherein the oscillator is to be calibrated in accordance with the first calibration value at each power-up event of the RFID tag.

10. The tag of claim 9, wherein the oscillator is to read the first calibration value from the non-volatile memory in response to each power-up event.

11. The tag of claim 1, including a demodulator and clock generation circuitry to generate a demodulator clock signal utilizing the oscillator, the demodulator clock signal being utilized by the demodulator of the RFID tag to demodulate a radio-frequency signal received at the RFID tag from an RFID reader.

12. The tag of claim 1, including a modulator and clock generation circuitry to generate a modulator clock signal utilizing the oscillator, the modulator clock signal being utilized by the modulator of the RFID tag to backscatter modulator radio-frequency signal transmitted from the RFID tag to an RFID reader.

13. The tag of claim 1, including clock generation circuitry to generate a system clock signal utilizing the oscillator.

14. The tag of claim 1, wherein the tag controller is to store a plurality of calibration values within the non-volatile memory, each of the calibration values corresponding to a respective oscillation frequency of the oscillator.

15. The tag of claim 14, wherein the tag controller is to select the first calibration value of the plurality of calibration values stored within the non-volatile memory according to a first selection criterion, and to cause calibration of the oscillator in accordance with first calibration value.

16. The tag of claim 15, wherein the first selection criterion includes any one of a group of selection criterion including a mode of operation of the RFID tag, a selection command received at the RFID tag, an ambient condition applicable to the RFID tag, and an internal voltage applicable to the RFID tag.

17. The tag of claim 1, including a volatile memory to store a further calibration value.

18. The tag of claim 17, including clock recovery circuitry to extract the further calibration value from a radio-frequency signal received at the RFID tag from an RFID reader.

19. The tag of claim 17, wherein the tag controller is to select between the first calibration value and the further calibration value, and to cause calibration of the oscillator in accordance with the selected calibration value.

20. The tag of claim 17, including a further oscillator to receive the further calibration value from the volatile memory and to be calibrated in accordance with the further calibration value.

21. The tag of claim 20, wherein the oscillator is used to backscatter modulate radio-frequency signal transmitted from the RFID tag to an RFID reader, and the further oscillator is utilized to demodulate a radio-frequency signal received at the RFID tag from the RFID reader.

22. The tag of claim 1, including calibration logic to calibrate the oscillator in accordance with the first calibration value by applying a successive approximation algorithm.

23. The tag of claim 1, including calibration logic to calibrate the oscillator in accordance with the first calibration value by applying a feedback algorithm.

24. A method of calibrating an oscillator within a radio-frequency identification (RFID) circuit for use in an RFID tag, the method including:

storing a first calibration value within a non-volatile memory associated with the RFID circuit; and

calibrating the oscillator in accordance with the first calibration value,

wherein the storing of the first calibration value is performed responsive to an update value at the RFID integrated circuit.

25. The method of claim 24, including receiving the update value in association with a calibration command, and generating the first calibration value within the RFID circuit in accordance with the calibration command, and wherein the update value is a first modification value by which a second calibration value, generated within the RFID circuit, is modified to generate the first calibration value.

26. The method of claim 25, wherein the generating of the calibration value includes at least one of incrementing and decrementing the second calibration value by the modification value to thereby generate the first calibration value.

27. The method of claim 24, wherein the update value is equal to the first calibration value, the update value having been generated by a calibration device external to the RFID tag.

28. The method of claim 27, including receiving the calibration command and the associated update value at the RFID circuit from the calibration device via at least one of a wire link and a radio-frequency link.

29. The method of claim 28, wherein the calibration device is at least one of an RFID reader and a tester device to a test the RFID circuit.

30. The method of claim 24, wherein the calibration value is independent of a frequency of a forward link radio-frequency signal received at the RFID tag.

31. The method of claim 24, wherein the calibrating of the oscillator is performed in accordance with the first calibration value at each power-up event of the RFID tag.

32. The method of claim 31, wherein the calibrating of the oscillator includes reading the first calibration value from the non-volatile memory in response to each power-up event.

33. The method of claim 24, including generating a demodulator clock signal utilizing the oscillator, the demodulator clock signal being utilized by a demodulator of the RFID tag to demodulate a radio-frequency signal received at the RFID tag from an RFID reader.

34. The method of claim 33, wherein the generating of the demodulator clock signal includes oversampling a received forward link radio-frequency signal to determine a second modification value by which an oscillation frequency of the oscillator is to be modified to generate the demodulator clock signal.

35. The method of claim 24, including generating a modulator clock signal utilizing the oscillator, the modulator clock signal being utilized by a modulator of the RFID circuit to backscatter modulator radio-frequency signal transmitted from the RFID tag to an RFID reader.

36. The method of claim 24, including generating a system clock signal utilizing the oscillator.

37. The method of claim 24, including storing a plurality of calibration values within the non-volatile memory associated with the RFID tag, each of the calibration values corresponding to a respective oscillation frequency of the oscillator of the RFID circuit.

38. The method of claim 37, including selecting the first calibration value of the plurality of calibration values stored within the non-volatile memory according to a first selection criterion, and calibrating the oscillator in accordance with first calibration value.

39. The method of claim 38, wherein the first selection criterion includes any one of a group of selection criterion including a mode of operation of the RFID tag, a selection command received at the RFID tag, an ambient condition applicable to the RFID tag, and an internal voltage applicable to the RFID tag.

40. The method of claim 24, including storing a further calibration value within a volatile memory associated with the RFID circuit.

41. The method of claim 40, including determining the further calibration value based on a clock signal recovered from a radio-frequency signal received at the RFID tag from an RFID reader, and storing the further calibration value in the volatile memory.

42. The method of claim 40, including selecting between the first calibration value and the further calibration value, and calibrating the oscillator in accordance with the selected calibration value.

43. The method of claim 40, wherein the RFID tag includes a further oscillator, the method including calibrating the further oscillator in accordance with the further calibration value stored in the volatile memory.

44. The method of claim 43, wherein the oscillator is used to backscatter modulate radio-frequency signal transmitted from the RFID tag to an RFID reader, and the further oscillator is utilized to demodulate a radio-frequency signal received at the RFID circuit from the RFID reader.

45. The method of claim 24, wherein the calibration of the oscillator in accordance with the first calibration value includes applying a successive approximation algorithm.

46. The method of claim 24, wherein the calibration of the oscillator in accordance with the first calibration value includes applying a feedback algorithm.

47. A radio-frequency identification (RFID) tag including:

a non-volatile storage means;

first means for receiving an update value, and for storing a first calibration value within the non-volatile storage means responsive to the calibration command and the associated update value; and

second oscillation means, coupled to the non-volatile storage means, for receiving the stored first calibration value from the non-volatile storage means and for being calibrated in accordance with the first calibration value.

48. A machine-readable medium storing a description of a circuit, said circuit comprising:

a tag controller to receive an update value, and to store a first calibration value within a non-volatile memory responsive to the calibration command and the associated update value; and

an oscillator, coupled to the non-volatile memory, to receive the stored first calibration value from the non-volatile memory and to be calibrated in accordance with the first calibration value.

49. The machine-readable medium of claim 48, wherein the description comprises a behavioral level description of the circuit.

50. The machine-readable medium of claim 49, wherein the behavioral level description is compatible with a VHDL format.

51. The machine-readable medium of claim 49, wherein the behavioral level description is compatible with a Verilog format.

52. The machine-readable medium of claim 48, wherein the description comprises a register transfer level netlist.

53. The machine-readable medium of claim 48, wherein the description comprises a transistor level netlist.